

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FOSSIL CYCADEAN TRUNKS OF NORTH AMERICA,
WITH A REVISION OF THE GENUS
CYCADEOIDEA BUCKLAND.

BY LESTER F. WARD.

The recent discovery of a large number of fossil cycadean trunks in the Cretaceous rim of the Black Hills, has furnished a new stimulus to the study of these forms in America. Such objects have been found at no less than six distinct North American localities. The oldest and best known forms are those first mentioned by Tyson from the Lower Cretaceous of Maryland. Dr. Emmons found one such in the Trias of North Carolina, and Sir Wm. Dawson another in the Trias of Prince Edward Island. All the rest, with one exception, are from Cretaceous strata, the age probably not widely differing from that of the Maryland specimens. These are from the Trinity division of the Comanche group in Southern Kansas, and from two localities among the foot-hills outside of the Red Beds of the Black Hills region in South Dakota. The exception to this is the *Cycadeoidea mirabilis* (Lx.) Solms (*Zamiostrobus mirabilis* Lx.), found on the surface of the ground by Dr. F. V. Hayden, near Golden, Colorado, within the Laramie, or Post-Laramie terrane. This locality is at the foot of the Front Range, and it would have been very easy for an erratic block to be borne down the mountain side and lodged in the valley where this was found. As is well known, older formations are encountered on ascending the eastern slope

of the Rocky Mountains, and Cretaceous and Jurassic strata undoubtedly crop out immediately above this locality.

Early in the spring of 1893, the National Museum obtained possession of a collection of six fine cycadean trunks from parties residing at Hot Springs, South Dakota, who had collected them at that vicinity.* One of these specimens measures thirty-one inches in height and twenty-four in greatest diameter, and weighs nine hundred pounds; the others are comparatively smaller, the smallest of all not exceeding a foot in height. Most of them are considerably flattened, but one or two are nearly circular in cross section. One of them exhibits a number of lateral branches, and in most cases the apex is depressed, forming the "crows nests" so characteristic of the specimens from the Isle of Portland, Dorsetshire, England.

In the *Geology of the Black Hills*, prepared by Professors Newton and Jenney, from their survey of 1875, and published at Washington in 1880, none of the Cretaceous strata below the Dakota group of Meek and Hayden, are recognized; and while I presumed from the general history of this class of vegetation that these remains came out of the Triassic Red Beds, or the overlying Jurassic, I was still so greatly interested to ascertain their true source that early in September last I made an expedition to the region, and in coöperation with Professor Jenney discovered the locality and made further collections, including one very much branching and very large trunk and many interesting fragments. All the remains of this class that have been thus far found in the southern part of the Black Hills, occur in the area mapped as Dakota group by Professor Newton, and, although no cycadean vegetation had yet been found amidst the extensive collections from the Dakota group of Kansas, Nebraska, and other more eastern localities, we were at first disposed to accept this as proof of their occurrence at that horizon in this region. But the great improbability of this assumption led us to make a careful examination of the series that had been thus classed by Professor Newton. The result was that we came to the conclusion that the Dakota group of Newton is much more extensive than the No. 1 of Meek and Hayden, and while the upper portion of it cer-

* See *Science*, Vol. XXI, New York, June 30, 1893, p. 355.

tainly belongs to the true Dakota, the lower portion very probably extends to near the base of the Cretaceous. The evidence upon which these conclusions rest will soon be published, and it need only be added that the cycadean trunks belong to this lower portion though not very near the base and may not differ greatly in age from those found in Southern Kansas and Maryland.

At another part of the Black Hills region, within the foothills on the Eastern side, some six or eight miles north of Rapid City, and between that place and Piedmont, and also probably in the Cretaceous area, two other specimens have been found and are now at the State School of Mines at Rapid City. The whereabouts of these specimens was not known at the time that I visited that section, but since my return Professor Jenney, appointed at about that time Dean of the Faculty of the State School of Mines, has discovered them there and has furnished me the data for the brief description given below, together with rough drawings, and measurements. From him I learn that in 1877, Mr. J. M. Leedy, then of Rapid City, now residing in Florida, found these specimens at the place stated, that they remained at his ranch for some time, were then placed on exhibition at a fair held at Library Hall, and not being supposed to have any value, were subsequently thrown out into a vacant lot, where they remained until removed to the School of Mines. These forms are much more cylindrical than those found in the southern section, and seem without doubt to constitute a new species. I have therefore named this species *Cycadeoidea Jenneyana*, in commemoration of Professor Jenney's great services to the people of that section as well as to science in general.

I have not seen Professor Cragin's specimens from Southern Kansas, and he unfortunately did not figure them, but he stated in his description that they very closely resemble the Maryland specimens, of which he had obtained a photograph and had learned some particulars as to size. While he thought these two forms were specifically identical, it is probably best to let them remain as distinct species for the present.

All of our American forms appear to belong to the genus *Cycadeoidea* of Buckland. None of the taller, more slender, palm-like, or branching trunks, belonging to the Old World genera *Bucklandia* and *Cylindropodium*, have yet been discovered this side of the Atlantic. The genera *Fittonia*, *Yatesia*, and

Platylophus, in which the leaf-bases are persistent, seem also to be absent. I have therefore made a careful revision of the genus Cycadeoidea condensing into it the Bolbopodium and Clathropodium of Saporta, and also referring to it all the species of Bennettites of Carruthers. The greater part of all this had already been done by the recent researches of Count Solms-Laubach, and it only remained to pick up a few of the outlying forms that did not come within the purview of his studies. If his results are accepted at all there is no logical stopping-place short of the embodiment of all these forms under the genus Cycadeoidea. It is of course possible that future exhaustive study, especially from the standpoint of internal structure, may result in the subdivision of this genus into several. But at present the tendency is toward consolidation, and a great uniformity is found in both the external and internal characteristics of the extinct Cycadaceæ.

In a much more extended paper, which is now in preparation, I hope to bring out the special characteristics of our American forms and to compare them with those of the Old World. Sections are now being made of some of the specimens from the Black Hills, and it is proposed to illustrate the internal structure of these specimens as fully as possible. Prof. F. H. Knowlton has consented to superintend the work of section cutting and to prepare the part of this paper relating to internal structure. Thus far we are in possession only of the Black Hills material and the single specimen of *C. mirabilis* described by Lesquereux in his Tertiary Flora. This specimen was loaned several years ago to Count Solms who made sections of it and prepared several slides, duplicates of which he sent back with the specimen. I also have a somewhat careful description of what he found, not only in letters received from him, but also in his memoir on the fossil cycads of Italy. Should other material come into our hands it will also be treated from the same standpoint.

I have endeavored in all cases to conform strictly to the law of priority now so rigidly enforced in all departments of natural history. I have been careful to give dates, so that the reasons for the deviations from the more current designations may be clear. If I have made any mistakes in this respect I shall be very thankful to receive corrections before the final paper is completed, this being one of the objects of this preliminary one.

REVISION OF THE GENUS CYCADEOIDEA BUCKLAND.

Genus *Cycadeoidea* Buckland.

1827. *Cycadeoidea* Buckland, Proc. Geol. Soc. Lond., Vol. 1, No. 8, pp. 80-81 (Session of June 6, 1827).
 1828. *Cycadeoidea* Buckland, Trans. Geol. Soc. Lond., 2 Ser., Vol. II, pp. 375-401, pl. xlv-xlix.

This genus seems to be the ultimate destiny of all cycadean trunks of dwarf bulb-like or conical form, deciduous leaf stalks and rhombic leaf scars. Count Solms-Laubach has already referred many of the species of *Bennettites* and *Clathropodium* to it, and the Marquis Saporta admits that one species of *Bolbopodium* belongs to the same genus as *C. pygmaea*. The fact alone that fruit has been found in one species (*C. Gibsoni*) seems insufficient ground for retaining the genus *Bennettites*. The only other name that has any claim to retention for this group is *Mantellia* of Brongniart, but his publication of it at the same date with Buckland's *Cycadeoidea* was a *nomen nudum*, and had moreover been used for an animal fossil. It is therefore generally given up. Brongniart himself conceded this, but wrote *Cycadoidea* on grounds of euphony. Even this cannot be allowed by the now more and more strictly enforced rules of nomenclature, and *Cycadeoidea* must stand as originally written by Buckland.

Cycadeoidea megalophylla Buckland.

1827. *Cycadeoidea megalophylla* Buckland, Proc. Geol. Soc. Lond., Vol. I, No. 8, p. 80.
 1828. Trans. Geol. Soc. Lond., 2d Ser., Vol. II, pp. 397-401, pl. xlvii, figs. 1-4; pl. xlviii, figs. 1-3.
 1828. *Mantellia nidiformis* Brongn., Prodrôme, pp. 96, 199.
 1837. *Mantellia megalophylla* (Buckl.) Bronn, Lethaea Geognostica, p. 227, pl. xv, fig. 2.
 1837. *Cycadites megalophyllus* Buckland, Geology and Mineralogy, etc., Vol. I, p. 497; Vol. II, p. 98; pl. lx, figs. 1, 2.
 1838. *Zamites megalophyllus* (Buckl.) Presl, in Sternberg's Versuch, etc., Vol. II, Hefte 7 and 8, p. 196.
 1842. *Encephlartos Bucklandii* Miquel, Monogr. Cycad., p. 60.
 1849. *Echinostipes nidiformis* (Brongn.) Pomel, Matériaux, etc., p. 16.
 1874. *Clathropodium megalophyllum* (Buckl.) Saporta, Pl. Jurass., Vol. II, p. 285, pl. lxxvi, fig. 1.

Purbeck beds, Isle of Portland, Dorsetshire, England.

Cycadeoidea microphylla Buckland.

1827. *Cycadeoidea microphylla* Buckland, Proc. Geol. Soc. Lond., Vol. I, p. 81.
 1828. Trans. Geol. Soc. Lond., 2d Ser., Vol. II, pp. 398–401, pl. xlix, figs. 1, 2.
 1834. *Strobilites Bucklandii* L. & H., Foss. Fl. Gt. Brit., Vol. II, p. 133, pl. cxxix.
 1837. *Mantellia microphylla* (Buckl.) Bronn, Lethaea Geognostica, p. 227.
 1837. *Cycadites microphyllus* Buckland, Geology and Mineralogy, etc., Vol. I, pp. 497, 498; Vol. II, pp. 98, 99, 100, pl. lxi, figs. 1–3; pl. lxii, figs. 2, 3.
 1838. *Zamites microphyllus* (Buckl.) Presl, in Sternberg's Versuch, etc., Vol. II, Hefte 7 and 8, p. 196.
 1849. *Echinostipes microphyllus* (Buckl.) Pomel, Matériaux, etc., p. 16.
 1874. *Clathropodium microphyllum* (Buckl.) Sap., Pl. Jurass., Vol. II, p. 284.

Purbeck beds, Isle of Portland, Dorsetshire, England. Morris gives as locality for *Strobilites Bucklandii*, not stated by Lindley and Hutton, the Upper Greensand of Wiltshire, and Presl says that the species is also found in the Lower Lias of Lyme Regis.

Cycadeoidea pygmæa L. & H.

1835. *Cycadeoidea pygmæa* L. & H., Foss. Fl. Gt. Brit., Vol. II, p. 175, pl. cxliii.
 1841. *Zamites pygmæus* (L. & H.) Morris, Ann. and Mag. Nat. Hist., Vol. VII, p. 116.
 1849. *Echinostipes pygmæus* (L. & H.) Pomel, Matériaux, etc., p. 17.
 1870. *Mantellia pygmæa* (L. & H.) Carruthers, Trans. Linn. Soc. Lond., Vol. XXVI, p. 703.

Lower Lias of Lyme Regis, England. Pomel thought he recognized the species in his material from France, but this may have been *C. Pictaviensis*.

Cycadeoidea Saxbyana (R. Brown) Morris.

1851. *Cycadites Saxbyanus* R. Brown, Proc. Linn. Soc. Lond., Vol. II, p. 130.
 1854. *Cycadeoidea Saxbyana* (R. Brown) Morris, Cat. Brit. Foss., 2d ed., p. 7.
 1867. *Bennettites Saxbyi* Carruthers, Brit. Assoc. Rep., 37th Meeting, Pt. II, p. 80.
 1870. *Bennettites Saxbyanus* (R. Brown) Carruthers, Trans. Linn. Soc. Lond., Vol. XXVI, pp. 681, 698, 706, pl. lvii, figs. 1–8.

Wealden of Brook Point, Isle of Wight, England.

Cycadeoidea Gibsoni Carruthers sp.

1867. *Bennettites Gibsoni* Carr., Brit. Assoc. Rep., 37th meeting, Pt. II, p. 80.
 1870. *Bennettites Gibsonianus* Carr., Trans. Linn. Soc. Lond., Vol. XXVI, pp. 681, 700, pl. lviii, figs. 1–5; pl. lix, figs. 1–9; pl. lx, figs. 1–12.

Lower Greensand of Luccombe Chine, Isle of Wight, England.

Cycadeoidea Portlandica (Carr.) Solms.

1870. *Bennettites Portlandicus* Carr., Trans. Linn. Soc. Lond., Vol. XXVI, pp. 681, 700, 707, pl. lxi, figs. 1-5.

1892. *Cycadeoidea Portlandica* (Carr.) Solms, Mem. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, p. 187.

Lower Purbeck beds, Isle of Portland, England.

Cycadeoidea maxima (Carr.) Solms.

1870. *Bennettites maximus* Carruthers, Trans. Linn. Soc. Lond., Vol. XXVI, pp. 681, 699.

1892. *Cycadeoidea maxima* (Carr.) Solms, Mem. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, p. 187.

Wealden of Shanklin, Isle of Wight, England.

Cycadeoidea Carruthersi.

1870. *Mantellia intermedia* Carruthers, Trans. Linn. Soc. Lond., Vol. XXVI, pp. 681, 702, 708, pl. lxiii, figs. 4, 5.

1874. *Cycadeoidea intermedia* (Carr.) Schimp. (non Ranzani), Paléontologie Végétale, Vol. III, p. 556.

Lower Purbeck beds, Isle of Portland, England.

The name *C. intermedia* being preoccupied by Ranzani in 1836 (see below) it was necessary to change it.

Cycadeoidea Peachii (Carr.) Solms.

1867. *Bennettites Peachii* Carruthers, Brit. Assoc. Rep., 37th meeting, Pt. II, p. 80.

1870. *Bennettites Peachianus* Carruthers, Trans. Linn. Soc. Lond., Vol. XXVI, pp. 681, 700, 707, pl. lxii, figs. 1, 2.

1892. *Cycadeoidea Peachii* (Carr.) Solms, Mem. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, p. 187.

Coral Rag of Helmsdale, Sutherlandshire, Scotland.

Cycadeoidea inclusa (Carr.) Schimper.

1870. *Mantellia inclusa* Carruthers, Trans. Linn. Soc. Lond., Vol. XXVI, pp. 681, 703, 708, pl. lxiii, figs. 2, 3.

1874. *Cycadeoidea inclusa* (Carr.) Schimper, Paléontologie Végétale, Vol. III, p. 556.

Lower Cretaceous of Potton, Cambridgeshire, England.

Cycadeoidea Bucklandi Corda sp.

1845. *Zamites Bucklandi* Corda, Beitr. z. Flora der Vorwelt, pp. 38, 120, pl. xvii, figs. 1-10.

Locality and formation unknown. Corda says that the specimen probably came from England. It resembles *C. Saxbyana*.

Cycadeoidea Morieri Renault sp.

1887. *Clathropodium Morieri* Renault, Bull. Soc. Linn. Normand., 4e Sér., Vol. I, pp. 143-151, pl. iv, v.

Purbeck beds, Isle of Portland, England,

Cycadeoidea forata (Sap.) Solms.

1875. *Clathropodium foratum* Saporta, Pl. Jurass., Vol. II, p. 297, pl. cxxiv, figs. 1, 2.

1892. *Cycadeoidea forata* (Sap.) Solms, Mem. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, p. 190.

Gault of Cauville near Havre, France. Saporta's original supposition that this form came from the Oolite of Mans (Sarthe) was subsequently found to be erroneous.

Cycadeoidea Pictaviensis (Longuemar) Saporta, ms.

1870. *Cycadeoidea Pictaviensis* (Longuemar) Saporta, ms., in Schimper: Paléontologie Végétale, Vol. II, p. 188; Atlas, pl. lxxi, fig. 12.

1870. *Araucaria Pictaviensis* Longuemar, Et. géol. et agron. sur le depart. de la Vienne, Vol. I, p. 491.

1874. *Bolbopodium Pictaviense* (Longuemar) Saporta, Pl. Jurass., Vol. II, p. 258, pl. cxviii, fig. 2.

Upper Oxford of Montanaise near Poitiers (Vienne), France.

Cycadeoidea Sarlatensis Saporta sp.

1849. *Cycadeoidea* sp. Brongniart, Tableau, p. 59.

1875. *Clathropodium Sarlatense* Saporta, Pl. Jurass., Vol., II, p. 293, pl. cxxiii, figs. 1, 2.

Upper Jurassic of Sarlat (Dordogne), France.

Cycadeoidea Trigeri Brongniart.

1849. *Cycadeoidea Trigeri* Brongniart, Tableau, p. 59.

1849. *Cycadites Trigeri* Brongn. ms., cf. Saporta, Pl. Jurass., Vol. II, p. 288.

1849. *Echinostipes* sp. Pomel, Matériaux, p. 17.

1874. *Clathropodium Trigeri* (Brongn.) Saporta, Pl. Jurass., Vol. II, p. 288, pl. cxxii, figs. 1-3.

Upper Jurassic of Mans (Sarthe), France.

Cycadeoidea micromera Saporta sp.

1874. *Bolbopodium micromerum* Saporta, Pl. Jurass., Vol. II, p. 262, pl. cxviii, fig. 1.

Corallian of Tonnerre (Yonne), France.

Cycadeoidea Mamertina Crié sp.

1879. *Bolbopodium Mamertinum* Crié, Les Anciens Climats et les Flores Fossiles de l'Ouest de la France, pp. 15, 18.

Bathonian of Mamers (Sarthe), France.

Cycadeoidea Montiana Capellini & Solms.

1755. *Lapideorum balanorum insignis congeries* Monti, Bonon. Sci. et Art. Inst. at. Acad. Comment., Tom. III, p. 323, tav. fol.

1892. *Cycadeoidea Montiana* Capellini & Solms, Mem. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 169, 181, 214, pl. iii, fig. 1.

Rio della Cavaliera, Bolognese, Italy. Cretaceous?

Cycadeoidea intermedia Ranzani.

1836. *Cycadeoidea intermedia* Ranzani, Resoconto Accad. Ist. di Bologna, 23a Sess., 26 maggio 1836.

1839. Nov. Com. Acad. Sci. Inst. Bonon., Tom III (Bull. Sci. Med., Vol. I), p. 385, tab., figs. 2, 3, 5.

Fiume Reno, Bolognese, Italy. Cretaceous?

Cycadeoidea Scarabellii (Mgh.) Cap. & Solms.

1854. *Mantellia*? *Scarabellii* Meneghini, Ann. dell Università Toscana, Tom. III, p. 74, nota 14.

1892. *Cycadeoidea Scarabellii* (Mgh.) Cap. & Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 170, 171, 176, 181, 207, 214, pl. iii, fig. 3.

Fiume Santerno, Imolese, Italy. Cretaceous? Meneghini maintained that this species belonged to the Miocene in which it was found, but Capellini does not doubt that, like most of the other Cycadean trunks of Italy, it was redeposited from the argillaceous shales of the underlying Cretaceous.

Cycadeoidea Pirazzoliana Massalongo, ms.

1858. *Cycadeoidea Pirazzoliana* Massalongo, ms.

1892. Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 171, 176, 181, 208, 212, pl. ii, fig. 1.

Torrente Correcchio, Imolese, Italy. Cretaceous?

Cycadeoidea Veronensis Massalongo.

1858. *Cycadeoidea Veronensis* Massalongo, Atti d. R. Ist. Veneto, Ser. 3a, Tom. III, Venezia, p. 816.

1859. Syllabus Pl. Foss. Agri Veneti, pp. 20, 132.

1892. Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 173, 181, 206.

In the garden Feruzzi-Malagnini, wall of the Padri in Verona, artificially so placed. Original source unknown. The specimen was discovered in this position by Massalongo and Scarbelli in 1858 mingled with stalactites and other objects. Capellini states that it was not mentioned in print until 1859 in the *Syllabus* on page 20, and seems not to have been aware that Massalongo embodied it under the same name in his "Elenco dei modelli di piante fossili donati al R. Istituto Veneto," published in 1858 in the Atti, Ser. 3, Tom. III, on page 816. He also includes it, along with *C. Bianconiana*, in the "Elenchus Specierum Vegetalium et Animalium Fossilium," etc., placed at the end of the *Syllabus* (see p. 132).

Cycadeoidea Bianconiana Massalongo.

1859. *Cycadeoidea Bianconiana* Massalongo, Syllabus Pl. Foss. Agri. Veneti, p. 132.

1892. Mem. Real. Accad. Sci., Ist. Bologna, Ser. V, Tom. II, pp. 172, 181, 205, pl. ii, fig. 2.

Torrente Samoggia, Bolognese, Italy. Cretaceous? Capellini seems not to have observed Massalongo's record of this plant in his *Syllabus*, p. 132. He there says: "Ex form. ignota agri Bononiensis. Caudex."

Cycadeoidea Cocchiana (Caruel) Solms.

1870. *Raumeria Cocchiana* Caruel, R. Com. Geol. Ital. Bol., Vol. I, pp. 183, 186; figs. on p. 186.

1892. *Cycadeoidea Cocchiana* (Caruel) Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 174, 181, 206, 215, pl. v, figs. 2, 5.

Torrente Marnia in Valdarno, Italy. Cretaceous? The specimens were found erratic in the Pliocene.

Cycadeoidea Maraniana (Scarab.) Solms.

1875. *Bennettites Maranianus* Scarabelli, ms.

1892. *Cycadeoidea Maraniana* (Scarab.) Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 176, 179, 181, 201, 212, 214, pl. ii, fig. 3; pl. iii, fig. 4.

Castel S. Pietro and Torrente Correcchio, Imolese, Italy. Cretaceous?

Cycadeoidea Capelliniana Solms.

1879. *Cycadacea specie* Ferreti, Atti Soc. Ital. Sci. Nat., Vol. XXI. p. 832.

1892. *Cycadeoidea Capelliniana* Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 174, 181, 207, 212, 214, 215, pl. i, figs. 3, 4; pl. v, figs. 1, 3, 6.

Fiume Idice, Bolognese; Torrente Tresinaro presso Scandiano; Paullo nel Regiano; Vallestra, Regiano, Italy. Cretaceous?

Cycadeoidea Masseiana Cap. & Solms.

1890. *Raumeria Masseiana* Capellini, Mem. Real. Accad. Sci. Ist. Bologna, Ser. IV, Tom. X, pp. 446, 450, pl. ii.

1892. *Cycadeoidea Masseiana* Cap. & Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 165, 168, 175, 178, 181, 205, 212, pl. i, fig. 1.

Cretaceous (Cenomanian?) clay shales of the Idice Valley, near the Villa di Ozzano in Emilia, Italy.

Cycadeoidea Etrusca Cap. & Solms.

1892. *Cycadeoidea Etrusca* Cap. & Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 177, 181, 204, 212, 214, 215, pl. i, fig. 2; pl. iv, fig. 1; pl. v, figs. 7, 8.

Etruscan Necropolis of Marzabotto, Bolognese, Italy. Cretaceous? Original source unknown. Specimen found placed on a tomb as an ornament or symbolic rite by the ancient inhabitants. It is the largest of the Italian specimens.

Cycadeoidea Ferretiana Cap. & Solms.

1892. *Cycadeoidea Ferretiana* Cap. & Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 178, 181, 209.

Monte Babbio, Regiano, Italy. Cretaceous?

Cycadeoidea Imolensis Cap. & Solms sp.

1892. *Cycadea Imolensis* Cap. & Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 176, 181, 200.

Fiume Santerno? Imolese, Italy. Cretaceous?

I have not hesitated to place this species in the genus *Cycadeoidea* because Count Solms gives as his only reason for not doing so that the specimen was too imperfect to be certain that it belonged there. He therefore created a new genus (*Cycadea*) for its reception. Such a course is certain to lead to great confusion. New genera should only be created where the material is so abundant and complete that it can be adequately characterized. This new genus is not even described, and as he admits, could not be from his specimen. It therefore can have no existence. On the other hand the large number of specimens found in Italy, all referable to *Cycadeoidea* make it altogether probable that this also belongs there. The only other course would be to hold it entirely in reserve. This he has not done but has given it a specific name.

Cycadeoidea sp. indet. Cap. & Solms.

1892. *Cycadeoidea* sp. indet. Cap. & Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 176, 181.

Fiume Santerno? Imolese, Italy. Cretaceous?

Cycadeoidea Reichenbachiana (Göpp.) Cap. & Solms.

1755. Vegetabilische Versteinerung Walch, Knorr's Petrefacten Sammlung, Text, p. 150; Atlas, pl. iiii, fig. 6.
 1844. *Raumeria Reichenbachiana* Göppert, in Wimmer: Flora von Schlesien, Ed. II, Vol. II, p. 217.
 1853. Jubiläums-Denkschr. d. Schles. Ges. f. vat. Cult., 1853, pp. 262, 265, pl. viii, figs. 4-7; pl. ix, fig. 1.
 1892. *Cycadeoidea Reichenbachiana* (Göpp.) Cap. & Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 186, 187, 188.

Lednice near Wieliczka, Galicia. This is the large and now celebrated specimen in the Dresden Museum. Its geologic age is still unknown, but is almost certainly not Permian as conjectured by Geinitz.

Cycadeoidea Schulziana (Göpp.) Cap. & Solms.

1844. *Raumeria Schulziana* Göppert, in Wimmer: Flora von Schlesien, Ed. II, Vol. II, p. 217.
 1853. Jubiläums-Denkschr. d. Schles. Ges. f. vat. Cult., 1853, pp. 259; 264, pl. vii, figs. 1-5; pl. viii, figs. 1-3.
 1892. *Cycadeoidea Schulziana* (Göpp.) Cap. & Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 186, 187.

Klodnitz Canal near Gleiwitz, Silesia; formation unknown.

Cycadeoidea Schachti (Coem.) Cap. & Solms.

1867. *Cycadites Schachti* Coemans, Mem. Cour. des Savants Etrangers de l'Acad. Roy. de Belgique, Vol. XXXIII, No. 3, p. 7, pl. iii, figs. 1, 2, 5.
 1870. *Clathraria Schachti* (Coem.) Schimper, Paléontologie Végétale, Vol. II, p. 212.
 1870. *Bennettites Schachti* (Coem.) Carruthers, Trans. Linn. Soc. Lond., Vol. XXVI, p. 699.
 1892. *Cycadeoidea Schachti* (Coem.) Cap. & Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, p. 187.

Gault of La Louvière, Hainaut, Belgium.

Cycadeoidea Marylandica (Font.), Cap. & Solms.

1860. *Cycas* sp. Tyson, First Report State Agric. Chem. Maryland, p. 42.
 1870. *Bennettites* sp. Carruthers, Trans. Linn. Soc. Lond., Vol. XXVI, p. 708.
 1879. *Cycadeoidea* sp. Fontaine, Am. Journ. Sci. 3d Ser., Vol. XVII, p. 157.
 1889. *Tysonia Marylandica* Fontaine, Flora of the Potomac Formation, p. 193, pl. clxxiv-clxxx.
 1892. *Cycadeoidea Marylandica* (Font.) Cap. & Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 179, 180, 186.

Potomac formation (Lower Cretaceous) at various points in Maryland, chiefly along the Baltimore and Ohio Railroad between Washington and Baltimore and in the vicinity of the latter city.

Cycadeoidea Emmonsii Font. sp.

1857. Trunk of a cycad Emmons, American Geology, Vol. VI, pp. 123, 124; fig. 92a.
 1883. *Zamiostrobus Emmonsii* Fontaine, Older Mesozoic Flora, p. 117, pl. lii, fig. 5.

Upper Trias of North Carolina, exact locality not known.

Judging from the excellent figure of Dr. Emmons, of which that of Professor Fontaine is not a true reproduction, I consider it much more probable that this was a "trunk of a cycad" than that it was a strobile.

Cycadeoidea mirabilis Lx. sp.

1876. *Zamiostrobus mirabilis* Lx., Bull. U. S. Geol. and Geogr. Surv. Terr., Vol. 1, 2d Ser., No. 5, p. 383 (issued January 8, 1876); Hayden's Ann. Rep. U. S. Geol. and Geogr. Surv. Terr. for 1874, p. 309.
 1878. Tertiary Flora, p. 70, pl. lxiii, figs. 1, 1a.
 1884. *Nelumbium* sp. James. Science, Vol. III, p. 434.
 1884. *Clathropodium mirabilis* (Lx.) Ward, Science, Vol. III, pp. 532 533.
 1890. *Bennettites mirabilis* (Lx.) Solms, in litt. (Sept. 10).
 1892. *Cycadeoidea Zamiiostrobus* Solms, Mem. Real. Accad. Sci. Ist. Bologna, Ser. V, Tom. II, pp. 210, 211.

Found lying on the surface of the ground near Golden, Colorado, in the Laramie terrane, but probably belonging to a more ancient formation from which it had been transported.

Cycadeoidea munita Cragin.

1889. *Cycadeoidea munita* Cragin, Bull. Washburn College Lab. Nat. Hist., Topeka, Kansas, Vol. II, No. 10, pp. 65, 66.
 Cheyenne Sandstone, Trinity Division of the Comanche Series (Lower Cretaceous), at Cheyenne Rock, Belvidere, Southern Kansas.

Cycadeoidea Dacotensis McBride sp.

1893. *Bennettites Dacotensis* McBride, American Geologist, Vol. XII, p. 249, pl. xi, figs. 1, 2; Bull. Lab. Nat. Hist. State Univ. of Iowa, Vol. II, No. 4, p. 391, pl. xii, figs. 1, 2.

Lower Cretaceous strata, valley of Minnekahta Creek near Minnekahta Station of the Burlington and Missouri Railroad, Fall River County, South Dakota (Black Hills).

Cycadeoidea Jenneyana n. sp.

Trunks cylindrical-conical, 15 to 17 inches in diameter and 2 to 3 feet high with concave depression ("crow's nest") at the summit; cross section of leaf stalks very irregular, rhombic or trapezoidal, two of the angles often very acute or prolonged indicating wings, the other angles obtuse.

Divide between Box Elder Creek and Elk Creek, six or eight miles north of Rapid City, South Dakota (Black Hills). Formation not yet determined but probably same as last.

The above description and data as to location are taken from letters received from Prof. W. P. Jenney, Dean of the Faculty of the State School of Mines at Rapid City where the specimens now are. There are two specimens, one of which shows the summit but lacks the basal portion and is 21 inches high and 15 inches in diameter at the lower end. The other shows the base but not the summit, is 17 inches in diameter and quite cylindrical, but truncated at the height of 16 inches. This form clearly indicates that the species at least is distinct from the last and it is possible that when better material is discovered it may require to be referred to some of the less dwarfed genera, such as *Bucklandia* or *Cylindropodium*. The distinction is further emphasized by the difference in the shape of the leaf bases or perforations left by their disappearance. I have named the species for Professor Jenney to whose assistance I am so greatly indebted in determining the geological position of the fossil plant beds in the southern portion of the Cretaceous rim of the Black Hills, a region which scientifically he has made his own.

Cycadeoidea Abequidensis Dawson.

1871. *Cycadeoidea Abequidensis* Dawson, Geol. Struct. Prince Edward Island, p. 45, pl. iii, fig. 29.

Trias of Gallas Point, Prince Edward Island. Sir Wm. Dawson referred this deposit doubtfully to the Lower Trias, but some regard it as the equivalent of the Newark System.